Mathematical Notes 2010 vol.88 N1-2, pages 39-47

Lie algebras and algebras of associative type

Koreshkov N.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

In the paper, some properties of algebras of associative type are studied, and these properties are then used to describe the structure of finite-dimensional semisimple modular Lie algebras. It is proved that the homogeneous radical of any finite-dimensional algebra of associative type coincides with the kernel of some form induced by the trace function with values in a polynomial ring. This fact is used to show that every finite-dimensional semisimple algebra of associative type A = ⊕αεG Aα graded by some group G, over a field of characteristic zero, has a nonzero component A1 (where 1 stands for the identity element of G), and A1 is a semisimple associative algebra. Let B = ⊕αεG Bα be a finite-dimensional semisimple Lie algebra over a prime field Fp, and let B be graded by a commutative group G. If B = Fp ⊗ℤ AL, where AL is the commutator algebra of a ℤ-algebra A = ⊕αεG Aα; if ℚ⊗ℤA is an algebra of associative type, then the 1-component of the algebra K⊗ℤB, where K stands for the algebraic closure of the field Fp, is the sum of some algebras of the form gl(ni,K). © 2010 Pleiades Publishing, Ltd.

http://dx.doi.org/10.1134/S0001434610070047

Keywords

algebra of associative type, finite-dimensional semisimple algebra of associative type, finite-dimensional semisimple Lie algebra, graded algebra